

EXAMINER INTERVIEW

The Applicants thank the Examiners for the interview extended to John Grover, the Applicants' counsel of record, on Thursday, February 21, 2002. During the interview, the Examiners agreed in the differences between the cited prior art and the Applicants' disclosure of the reaction chamber, and the Examiners suggested that arguments focusing on the claims be presented in a follow-up response. Accordingly, the Applicants provide herewith a written submission of the various arguments presented during the interview. Reconsideration of the pending claims in light of the interview is therefore respectfully requested.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 103(a)

The Office Action rejected Claims 6-9, 15-35 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 6,273,108 (the "Bergman et al." patent) in view of U.S. Pat. No. 6,132,629 (the "Boley" patent). The Applicants respectfully traverse these rejections for the following reasons.

The Applicants have disclosed and claimed various embodiments of an ozone shower system that delivers ozone to a workpiece, such as a cassette of semiconductor wafers, in a manner designed to increase the reaction of the ozone with the workpiece. Moreover, because the ozone shower system varies the flow of fluid to the workpiece during the ozone reaction, the ozone shower system advantageously avoids rotating the workpiece at excessive speeds, thereby allowing for a more straightforward design in the rotating assembly and avoiding damage to the workpiece caused by high rotation speeds.

According to various claims, the ozone shower system varies and/or pulses a ozone-rich spray through a chamber lid having multiple spray nozzles, to a stationary or slowly rotating workpiece, thereby generating an ozone-rich fluid layer over the workpiece. Various claims include specific duty cycles, revolutions of the workpiece, and the like, to precisely control the thickness of the water layer, thereby controlling the effectiveness of the ozone absorption and reaction with the workpiece.

In contrast, the Bergman et al. patent discloses a reaction chamber very similar to those discussed in the background section of the Applicants' disclosure. For example, the Bergman et al. reference requires a continuous spray and teaches to use very high rotation velocities (e.g., 300 to 1500 revolutions per minute) to control the boundary layer of fluid on

the workpiece. See Bergman et al., Figure 1, Col. 6, Lines 10-15 and 24-35; See also Applicants' disclosure, Page 2, Lines 2-18. As discussed, such high rotation velocities require complex rotating assemblies and often damage the workpiece.

The Boley patent on the other hand discloses a fluid source for providing continuous or intermittent ozonated fluid to ice machines, surgical wash stations, small washing operations, waste destruction, and for the disinfecting of various food. See Col. 2, Lines 20-25. The Boley patent employs intermittent use to provide only small amounts of ozone because ozone is "highly corrosive." See Col. 2, Lines 5-10. Thus, the Boley patent is trying to minimize the amount of ozone in order to avoid the highly corrosive effects thereof. Thus, the Applicants submit that an artisan attempting to increase the amount of ozone applied to a workpiece in order to maximize ozone's corrosive effects thereon, would not look to the teachings of minimizing ozone, as required by the Boley patent. Accordingly, the Applicants submit that the Bergman et al. patent teaches away from the Boley patent, and therefore, the combination thereof is improper.

It appears that in making the foregoing prior art combination, the Office Action has impermissibly used hindsight derived from the teachings in the present application, and not the teachings of the prior art. In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999) (holding the Board impermissibly used hindsight in determining obviousness); See also, M.P.E.P. § 2145, part X.A. In Dembiczak, the Federal Circuit reiterated that a determination of obviousness cannot simply rely on the inventor's disclosure as a "blueprint" without evidence of a suggestion, teaching or motivation in the prior art. Dembiczak, 175 F.3d 994, 999. Also, according to M.P.E.P. § 706.02(j), "[t]he teaching and suggestion to make the claimed combination and the reasonable expectation for success must both be found in the prior art and not based on the Applicant's disclosure." (emphasis added).

Even if the combination were found to be proper, which it is not, the Bergman et al. patent, alone or in combination with the Boley patent, must teach or suggest all the claim limitations in order to establish a *prima facie* case of obviousness. See M.P.E.P. § 2143. With respect to the pending claims, independent Claim 6 recites, among other things, an ozone shower system, comprising a selector valve configured to selectively pulse the fluid through the sprayer. As discussed in the foregoing, the Bergman et al. patent teaches use of a continuous flowing fluid, and the Boley patent teaches only an intermittent supply. Therefore, the Applicants submit that the Bergman et al. patent, alone or in combination

with the Boley patent, fails to teach or suggest the claimed selector valve. Accordingly, the Applicants respectfully request withdrawal of the rejection of Claim 6, and dependent Claims 7-9.

Independent Claim 15 recites, among other things, a reaction chamber comprising a first fluid line and a second fluid line capable of diverting water from the first fluid line. As discussed with respect to Claim 6, the Bergman et al. patent discloses only continuous flow. The Office Action asserts that the Boley patent fills in the lack of teaching found in the Bergman et al. patent, by disclosing a second line as the line leading to the ozone destruction system 21 of Figure 1. However, the Boley patent describes this line as used to remove "off gas," and not fluid, which bubbled through the water holding vessel 23. Therefore, the Boley patent also fails to teach or suggest a second fluid line capable of diverting fluid in order to create a pulse. Thus, the Applicants submit that the Bergman et al. patent, alone or in combination with the Boley patent, fails to teach or suggest, among other things, the claimed second fluid line. Accordingly, the Applicants respectfully request withdrawal of the rejection of Claim 15.

Independent Claim 16 recites, among other things, a reaction chamber comprising a rotator capable of rotating the semiconductor workpiece during a removal of a portion of the workpiece at a velocity not exceeding 100 RPM. As discussed in the foregoing, the Bergman et al. patent clearly teaches and requires much higher velocities. The Office Action asserted that specific RPMs would have been obvious because of routine experimentation to find an optimum result. However, a "particular parameter must first be recognized as a results-effective parameter, i.e., a variable which achieves a recognized result, before the ... ranges ... might be characterized as routine experimentation." See M.P.E.P. § 2144.05(II)(B). Thus, the Applicants assert that because the Bergman et al. patent discloses only ranges much greater than those of the Applicants claims, the Bergman et al. patent does not recognize results in the lower ranges, and in fact, explicitly teaches away from use of those lower ranges.

Thus, the Applicants submit that the Bergman et al. patent, alone or in combination with the Boley patent, fails to teach or suggest, among other things, the claimed slower rotation during the removal of portions of the workpiece. Accordingly, the Applicants respectfully request withdrawal of the rejection of Claim 16.

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Independent Claims 17 and 27 recite, among other things, a processing chamber and a pulsing fluid source. As discussed in the foregoing, the Bergman et al. patent requires a continuous source, and the combination with the Boley patent is not proper, as it teaches away from increasing an amount of ozone reaching the workpiece by pulsing the fluid source. Accordingly, the Applicants respectfully request withdrawal of the rejection of Claims 17 and 27, as well as dependent Claims 18-26 and 28-35.

Dependent Claims 21-26 and 30-35 recite, among other things, specific duty cycles relating to the pulsing of the fluid. The Office Action asserted that specific duty cycles would have been obvious because of routine experimentation to find an optimum result. However, as described in the foregoing, a particular parameter must first be recognized as a results-effective parameter before the ranges might be characterized as routine experimentation. As discussed, the Bergman et al. patent and the Boley patent fail to teach, suggest, or even mention a duty cycle. Therefore, the Applicants assert that Bergman et al. and Boley patents do not recognize the duty cycle as a result-effective parameter, and therefore, a determination of obviousness based on routine experimentation is improper. Accordingly, the Applicants respectfully request withdrawal of the rejections of Claims 21-26 and 30-35.

NEW CLAIMS

New Claims 63-79 have been added to more fully define the Applicants' invention and are believed to be fully distinguished over the prior art of record.

CONCLUSION

In view of the foregoing, the present application is believed to be in condition for allowance, and such allowance is respectfully requested. If further issues remain to be resolved, the Applicants' undersigned attorney of record hereby formally requests a telephone interview with the Examiner.

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Also, please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Version With Markings to Show Changes Made

Insertions appear as underlined text, for example, insertions, while deletions appear as strikethrough text, for example, ~~deletions~~.

15. (Amended) A reaction chamber comprising:
a gas input;
a plurality of nozzles connected to a nozzle manifold;
a wafer cartridge holding wafers;
a first fluid line ~~connected~~ supplying fluid to the nozzle manifold; and
a second ~~water-fluid~~ line configured to divert water flow capable of diverting
the fluid away from the first fluid line.

16. (Amended) A reaction chamber which removes a portion of a semiconductor workpiece by applying an intermittent fluid to the portion during removal, the reaction chamber comprising:

at least one nozzle connected to a fluid supply and configured to pulse fluid onto a semiconductor workpiece; and

a rotator ~~wherein the rotator rotates~~ capable of rotating the semiconductor workpiece during a removal of a portion of the semiconductor workpiece at a velocity not exceeding ranging from approximately 100 revolutions per minute (RPM) rpm to stationary.